

**Notice of Allowability**

Application No.

10/756,442

Examiner

Boris Benenson

Applicant(s)

DOVHEIM, THOMAS

Art Unit

2836

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 1/12/2004.
2. ☒ The allowed claim(s) is/are 1-10.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

*Detailed Actions*

**EXAMINER'S AMENDMENT**

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

1. The following changes to the drawings have been approved by the examiner: Figure 3 should be labeled as Prior Art, as it indicated in section Brief Description Of The Drawing of the Specification. In order to avoid abandonment of the application, applicant must make these drawing changes.

*Allowable Subject Matter*

2. Claims 1-10 are allowed.

**The following is an examiner's statement of reasons for allowance:**

3. Independent Claim 1 is allowable because none of the prior art of record disclose a method for solenoid control comprising steps: providing a freewheel circuit that includes a solenoid, providing a current-control circuit comprising a differencing

Art Unit: 2836

component, providing a voltage-control circuit comprising a second differencing component and having a structure similar to that of the current-control circuit and controlling the rate at which the current within the freewheel circuit decreases in combination with the other claim limitations.

4. Independent Claims 4, and 10 are allowable because none of the prior art of record disclose a circuit arrangement for controlling a solenoid that activates a valve in a fuel-injection system comprising current-control circuit operable to switch current through the solenoid and a voltage-control circuit applying a continuously adjustable voltage such that the time it takes the current through the solenoid to drop from the pull-in level to the hold level is adjustable above a minimum time in combination with the other claim limitations.

#### ***Related Prior Art***

5. Studtmann et al. U.S. Patent 4,949,215 titled "Driver for high speed solenoid actuator" disclosed a circuit, where the driver

"automatically reducing the solenoid current at a rapid rate to a lesser level of regulated solenoid hold current for the remaining duration of actuator operation, and rapidly reducing the solenoid current between acceleration and holding levels and

for rapid solenoid release", but doesn't have a voltage control to control a rate of the current reduction.

6. Shimanuki et al. U.S. Patent 5,574,617 disclose a "Fuel injection valve drive control apparatus" where control signal is changing between "on" and "off" and there are no adjustable voltage control to control rate of current deceleration.

7. Stoll et al. U.S. Patent 6,262,874 disclose a "Circuit Device" where a solenoid is controlled by current controlling circuit and doesn't have a voltage control to control a rate of the current reduction.

***Comments to reasons for allowance***

8. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

**Contact information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Boris Benenson whose telephone number is (571) 272-2048. The examiner can normally be reached on M-F (8:20-6:00) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be


Art Unit: 2836

reached on (571) 272-2800 ext 36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Boris Benenson  
Examiner  
Art Unit 2836

B.B.



**BRIAN SIRCUS**  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600